THE

Malayan Agricultural Journal.

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EDITORIAL.

The Tea Industry in Malaya.

For practical purposes it may be said that the commercial production of tea in Malaya commenced about 1927, and by 1930 the production from estates had reached 95,000 lbs., of which rather more than one-third was exported. This tea was all grown on the lowlands, and it was not until 1932 that small consignments of tea from Cameron Highlands found their way on the local market, and a year later exports from this centre were offered for sale on the London market.

Since then, the production of tea from both Cameron Highlands and the lowland areas has steadily increased, as new areas come into bearing and the older areas reach maturity. In recent years the development of areas for tea cultivation has proceeded at a greater rate in the Highlands than in the lowlands, and as far as one can see at present, in the course of the next few years the production in the Highlands will be greater than in the lowlands.

An encouraging feature of the development of the tea industry in this country has been the early exploitation of the local market. Necessarily, the development of this market is a gradual process; the product has first to compete with imported, well-known and widely advertised brands, public taste must be courted, and the organization of distribution built up. The fact that in 1939 about 50 per cent. of production was sold locally is a satisfactory result, which we believe has been achieved by a growing realization amongst tea drinkers of the excellent quality of the local product, backed by the protective tariff on imports into all parts of Malaya with the exception of Johore.

An article included in this number, summarizing the position of the industry at the end of 1939, will be read with interest, and is opportune in view of recent developments affecting the marketing of tea in the United Kingdom.

The suitability of Cameron Highlands for the cultivation of tea was proven by the Department of Agriculture, who established an experimental Station at Tanah Rata some years before road access to the Highlands was completed. Tea experiments were commenced in 1926 and by the time that the road to the Highlands was available, full advantage was taken of the work of the Department and tea became the crop of first importance.

By this time also, the experiments of the Department of Agriculture in the lowlands, verified by estates that undertook the cultivation of this crop, proved that the cultivation of tea under these conditions gave exceptionally high yields of leaf, of a quality that exceeded expectations. Consequently, the commercial production of tea in the lowlands was expanded with success on several areas.

The development of the tea industry in Malaya has been achieved in the face of many unforseen difficulties. Coincident with its growth, world prices of tea slumped heavily, leading to the combination of interests in the three important centres of production—India, Ceylon and the Netherlands Indies—in the form of the establishment of an International Tea Committee which in 1934 arrived at a 5 years' Agreement to limit the further planting of tea and to control the marketing of the product.

After protracted negotiations Malaya entered the Agreement at the end of 1936, on terms which restricted the further development of the industry within narrow limits, but did not interfere with the sale of tea in this country or in the United Kingdom. The second 5 years' Agreement was made for the period 1938-1943. Malaya eventually entered this Agreement on terms which once more placed a limit to the rate of expansion of the planted area.

That the control of tea planting in Malaya has worked smoothly is in no small measure due to the fact that those interested in the development of areas under this crop have co-operated by adjusting their planting programme to fit into the scheme.

Original Articles.

THE MALAYAN TEA INDUSTRY IN 1939

BY

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Prices.

The wholesale price of tea was fairly steady for the first eight months of the year. From the outbreak of war London prices of tea were not quoted. Table I shows the average prices obtained on the London market for tea of Malayan origin, and, for purposes of comparison, the prices obtained on that market for tea from other countries.

Table I.
London Prices of Tea.
per lb.

1939	Malayan				Ceylon	Java	India North	India South	Sumatra
	Number of Packages		Prices						
	Upland	Low-land	Upland	Low-land					
			s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
January ...	390	474	1 2.30	11.68	1 2.96	11.70	1 1.18	1 1.72	10.65
February ...	102	140	1 3	11.63	1 3.07	1 0.09	1 1.16	1 1.80	10.83
March ...	132	502	1 2.75	11.63	1 3.95	1 1.25	1 0.68	1 2.44	10.65
April ...	208	316	1 3.50	1 0.12	1 4.49	1 3.40	1 0.91	1 2.95	11.28
May ...	240	294	1 3.42	1 0.25	1 3.89	1 2	1 1.17	1 3.35	11.53
June ...	148	426	1 3.50	1 0.29	1 3.05	1 0.67	1 1.99	1 2.23	11.08
July ...	130	546	1 2.88	11.94	1 2.15	1 0.40	1 2.11	1 0.86	10.9
August ...	432	454	1 2.45	11.91	1 2.83	1 1.47	1 3.94	1 1.07	10.95
	1782	3152							

The Tea Agreement.*

Under the first International Tea Agreement, which terminated on 31st March 1938, Malaya undertook that the area planted between the end of 1936, (when Malaya entered the Agreement) and the date of its termination should not exceed

* See also Tea Regulation in Malaya. *Malayan Agricultural Journal,* Vol. XXVII, No. 7. July 1939, from which much of the following information is summarized.

3,000 acres, and that the total area planted in Malaya by the end of the first Agreement should not exceed 6,000 acres. Owing to a number of reasons, the total area planted by the end of the first Agreement was only 4,716 acres.

Following protracted discussions between the Malayan Government and the International Tea Committee, the Government requested the United Planting Association of Malaya to form a Tea Planters' Committee and to appoint a negotiator. This course was followed, and the Committee appointed Sir John Hay as its London representative for negotiating with the International Tea Committee.

The agreement eventually reached was that Malaya would limit planting during the currency of the second Agreement, which terminates on 31st March 1943, so that the total area to be planted might be expected to produce the equivalent of Malaya's probable future tea consumption. It was estimated that an additional 10,000 acres would be sufficient to ensure this object.

Applications for permission to plant tea during the period 1939 to March 1943 were invited to be made from 6th July to 6th September 1939, and before the end of the year applications had been received for the whole of the area allowed under the Agreement. Licences were issued to cover planting in 1939 and 1940, and the balance of allotment reserved for the applicants, to whom in due course licences will be issued to cover 1941 and 1942-1943 (to end March 31st) provided that they have fulfilled the planting programme for 1939 and 1940.

The arrangements have worked smoothly and although the planting programme for 1939 on most estates could not be fulfilled, owing to unsuitable weather, it is anticipated that the leeway will be made up during the year 1940.

Area under Tea.

The total area planted with tea in Malaya, showing years of planting, is given in Table II. It will be noticed that the figures for 1937 and 1938 differ from those given in the review of the industry for 1938*. The present figures are compiled from questionnaires sent to all estates at the end of 1939, and may therefore be considered the more accurate.

The table given in the review for 1938 referred to estates only. A note was made to the effect that there were, in addition, areas of tea planted on small holdings aggregating 559 acres. Almost all of these small areas are known to contain very old tea plants. All these areas, to a total of 533 acres, have now been considered as tea planted before 1930 and included in Table II. The distribution of these areas is as follows:—Johore 49 acres, Selangor 460 acres, Negri Sembilan 9 acres, Perak 6 acres, Pahang 4 acres, Penang 4 acres, Malacca 1 acre. It is hoped in 1940 to check up these areas as the total may be considered as a conservative estimate.

Of the total area of 3,756 acres of upland tea, 3,696 acres are situated at Cameron Highlands.

The distribution of the lowland planted areas, by States, is as follows:—Selangor 2,015 acres, Perak 314 acres, Pahang 5 acres, Negri Sembilan 32 acres, Kedah 865 acres, Johore 49 acres, Malacca 1 acre, Penang 6 acres.

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* *Malayan Agricultural Journal*, Vol. XXVII, No. 4, April 1939.

Table II.

Total Area Planted with Tea, Malaya.

(Acres)

	Before 1930	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	Total Area	Reserve Land
Upland areas ...	98	325	164	86	43	52	269	336	781	1,002	600	3,756	5,437
Lowland areas ...	1,620	188	63	6	—	6	81	88	321	578	336	3,287	3,140
Total ...	1,718	523	227	92	43	58	350	424	1.102	1,580	936	7,043	8,577

The total area of land planted with tea at the end of 1939 was 7,043 acres, of which 936 acres were planted during the year under review. The year was for the most part hot and dry, rains uncertain and not seasonal. These factors materially affected planting programmes on many estates.

Production.

The estate production of tea in 1939 amounted to 1,313,094 lbs. as compared with an estimate made in 1937* of 1,539,000 lbs. The actual production was 558,619 lbs. upland and 754,475 lbs. lowland, and the estimate was 545,000 lbs. upland and 994,000 lbs. lowland. The production by States in the lowlands was: Selangor 421,448 lbs., Perak 107,164 lbs., Negri Sembilan 3,363 lbs., Kedah 222,500 lbs. These figures tend to confirm the opinion stated in the report last year that the production of tea per acre on upland estates may be greater than the present generally accepted figures, and lowland production rather less than anticipated. Crops in the year under review, however, were generally below the average due to the long dry spells which retarded the "flushing" of the bushes.

The production of tea on small holdings in the lowlands is unknown, but, judged by an inspection of the condition of many of these small areas, it is probably in the region of 450 lbs. per acre, giving, for the year 1939, a production from this source of 240,000 lbs.

The total production of tea in Malaya in 1939 was therefore 1,553,094 lbs., as compared with 1,467,306 lbs. in 1938 and 1,251,071 lbs. in 1937.

The annual production of tea on estates is shown in Table III. It will be noted that the exports of Malayan-grown tea declined, while sales for local consumption have increased. Stocks of tea held on estates at the end of the year amounted to 59,965 lbs. uplands and 78,332 lbs. lowlands, a total of 138,297 lbs.

Table III.

Malayan Production and Exports of Tea.

(Estates only)
in lbs.

Year	Upland			Lowland			Total		
	Produced	Exported	Sold Locally	Produced	Exported	Sold Locally	Produced	Exported	Sold Locally
1930	—	—	—	95,040	35,730	59,310	95,040	35,730	59,310
1931	—	—	—	127,988	31,000	95,662	127,988	31,000	95,662
1932	4,382	—	3,161	138,694	16,472	123,101	143,076	16,472	126,262
1933	39,440	6,990	29,958	172,449	59,952	118,997	211,889	59,942	148,955
1934	115,874	44,072	64,510	228,497	74,843	152,789	344,371	118,915	217,299
1935	212,927	163,787	30,431	418,735	238,189	173,583	631,662	401,976	204,014
1936	327,796	253,308	79,162	616,970	397,074	210,788	944,766	650,382	289,950
1937	373,767	183,026	182,431	627,304	400,026	229,113	1,001,071	583,052	411,544
1938	507,654	292,296	198,978	709,652	455,007	235,646	1,217,306	747,303	434,624
1939	558,619	265,403	286,211	754,475	382,468	332,261	1,313,094	647,871	618,472

* *Malayan Agricultural Journal*, Vol. XXVI, No. 4, page 158, April 1938.

Consumption.

The consumption of tea in Malaya may be taken to comprise the sum of net imports, local sales of Malayan-grown tea, and the produce of small holdings. The total consumption in Malaya in 1939 was, on this basis, 4,392,288 lbs., as compared with 4,150,540 lbs. in 1938 and 5,542,171 lbs. in 1937, or a little over $\frac{3}{4}$ lb. per head of population. No information of stocks of tea carried by dealers from one year to another is available, so that figures of total consumption in any one year must be treated as only approximately correct.

Table V.
Net Imports of Tea into Malaya.

Year	Black		Green		Total Net Imports.	
	Quantity lbs.	Value $	Quantity lbs.	Value $	Quantity lbs.	Value $
1923 ...	—	—	—	—	6,828,977	2,391,264
1924 ...	—	—	—	—	7,176,274	2,783,349
1925 ...	—	—	—	—	7,825,840	3,138,327
1926 ...	—	—	—	—	9,664,809	3,947,613
1927 ...	—	—	—	—	9,539,195	4,041,901
1928 ...	—	—	—	—	8,647,440	3,769,141
1929 ...	—	—	—	—	10,152,422	3,885,275
1930 ...	—	—	—	—	8,732,453	2,872,220
1931 ...	—	—	—	—	6,845,748	1,665,644
1932 ...	3,498,909	725,119	944,474	290,450	4,443,383	1,015,569
1933 ...	2,404,482	537,059	836,135	317,091	3,240,617	854,150
1934 ...	3,264,661	764,634	1,177,582	472,211	4,422,243	1,236,845
1935 ...	2,674,599	717,118	1,384,957	507,068	4,059,556	1,224,186
1936 ...	2,307,188	408,769	1,587,405	498,135	3,894,593	906,904
1937 ...	2,709,302	440,905	2,171,325	625,962	4,880,627	1,066,867
1938 ...	2,170,856	445,939	1,295,060	332,145	3,465,916	778,084
1939 ...	2,653,512	599,327	880,294	241,515	3,533,816	840,842

Imports of black and green tea were not shown separately before 1932.

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TEA SEED PRODUCTION AND GERMINATION EXPERIMENTS AT THE CENTRAL EXPERIMENT STATION, SERDANG

BY

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Introductory.

Tea seed is usually produced at high elevations within the tropics or in sub-tropical countries and it is still not generally known whether large-scale production is possible in the tropical lowlands.

An account was given in a previous Departmental publication of the establishment and development of a small area of seed bearers at the Central Experiment Station, Serdang, with the object of obtaining information on this point.(1) Serdang is situated in latitude 3° N. and at an altitude of approximately 175 ft.

The present article summarizes the results of the previous work; in addition details are given of the behaviour of the trees and the annual yields of sound seed to date. A description is also included of experiments carried out regarding the germination of tea seed from the Station under varying conditions of treatment.

History of Seed Bearers.

An area of 4 acres of 6 months old Manipuri type tea seedlings was established in May, 1931, in Field 18. The young plants were spaced 12 ft. x 12 ft., square spacing, and were allowed to develop naturally without any severe pruning.

The eastern half of the area, which is on rather richer soil, was shaded with *Albizzia falcata*, spaced 24 ft. x 24 ft.; the western half was unshaded, but *Gliricidia maculata* cuttings were established between every second row of tea bushes.

The growth of *A. falcata* was so rapid and the overhead shade tending to become so dense that during 1934 every second tree was removed, thereby increasing the spacing to 48 ft. x 48 ft. In the case of *G. maculata* the trees have been lopped back periodically and never allowed to produce an overhead shade.

Most of the tea bushes have developed several strong shoots but a few have a single main stem only. The bushes, which are from 20 to 25 ft. high, have extended laterally until they are now touching each other.

Flowering and seed production are continuous throughout the year; the latter, however, is not evenly distributed. Yields are greatest during the months of June to September, after which they decline steadily until during the period December to February only a few pounds of seed per acre are obtained. Subsequently the monthly harvest increases until the peak period is again reached.

Harvesting at Serdang is undertaken at weekly intervals. The fallen ripe fruits and seeds are collected from the ground and not picked from the bushes. It is frequently noticed, however, that mature fruits which have cracked open but have not shed the enclosed seed remain on the bush; therefore in the heaviest yielding months the branches are shaken to dislodge the mature fruits.

Tea Fruits and Seeds.

The normal tea fruit is a capsule consisting of two fused carpels, each containing one seed. Fruits containing three, four, or only one carpel are not uncommon and sometimes a single carpel may contain more than one seed.

The capsule wall remains green until the seed reaches maturity, when it becomes hard, dry, and brown in colour. As this darkening and hardening of the fruit wall takes place it usually splits longitudinally. Some of the seeds fall from the capsules but some fall to the ground still enclosed by the capsule walls. As soon as the mixture of seeds and capsules has been gathered it is usual to open the capsules by hand—an operation known as shelling*—so as to separate the seeds from the capsule wall. Shelling is a tedious operation when dealing with large quantities of seed owing to the hardness of the capsule walls necessitating the use of a knife.

Viability of Tea Seed.

Tea seed shows a rapid deterioration when stored for more than a few days under normal conditions of temperature and humidity in the tropical lowlands. This loss of viability is associated with a loss of moisture from the seed accompanied by a shrinkage of the cotyledons and an increase in the air space enclosed by the seed wall. Thus, the seed becomes lighter in weight and will float in water, whereas good well-filled seeds will sink. Use is made of this fact to determine the amount of sound seed in a sample, and, provided the seed has been freshly gathered, the results can be considered reliable. If, however, seed has been lying on the ground in a damp situation for some time it may have absorbed sufficient water, although decomposed inside, to sink similarly to sound seed.

Experience at Serdang shows, however, that when seed is collected regularly only the sound seed sinks, almost all the bad seed floating on the surface of the water.

Wet Method of Shelling Tea Seed.

A considerable saving in labour can be effected by using the wet method of shelling described by Harler.(2)

In this method the freshly-harvested capsules and seeds are mixed with a large quantity of moist sand and the mixture stored in a shaded shallow pit for 4 days. The amount of sand must be sufficient to prevent the seeds from touching, otherwise heating will take place and the seed will deteriorate. The seeds and fruits can be separated from the sand by sieving.

As a result of the treatment, the capsule walls soften and open wider so that the seeds can be easily removed without the use of a knife.

Yield of Seed.

Table I summarizes the annual yields of sound seed obtained from the shaded and unshaded plots at Serdang for the period 1934 to 1939 inclusive.

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* *Note.* Some authors use the term shelling to mean removal of the hard woody outer integument or shell of the seed. In the present article the term is used to indicate removal of the fruit or capsule walls leaving the woody seed coat intact.

Table I.

Yields of Sound Seed (Shelled Sinkers) from Shaded and Unshaded Plots at Serdang from 1934 to 1939.

(lbs. per acre.)

Year	Shaded	Unshaded
1934 ...	86	58
1935 ...	150	149
1936 ...	54	45
1937 ...	164	123
1938 ...	968	136
1939 ...	972	403

The results indicate a phenomenal increase in the yields from the trees in the shaded plots during the past two years; the increase in yield from the trees in the unshaded plots for 1939 compared with 1938 is also noteworthy.

Germination of Tea Seed.

The investigation on the germination of tea seed included experiments on the following lines:—

(a) Necessity for shelling seed before planting.

(b) Comparative tests between freshly gathered and stored seed shelled by both wet and dry methods.

(c) Change in germination of tested sinkers which became floaters after storage.

(1) *Germination of Shelled and Unshelled Seed.*

A quantity of freshly-fallen capsules of a pure Manipuri jat of tea was tested in water and the floaters discarded. Of the sinkers one-half was shelled by removing the capsule wall by means of a knife, the other half being left unopened.

The shelled and unshelled seeds were planted separately in shaded sand beds in rows of 25 in a randomized block lay-out with four replications.

After 3 months, when most of the seedlings had 4 or 5 leaves, a count was made and it was found that in each block the shelled seed had given better germination. The average germination for the shelled seed was 80 per cent. compared with 32 per cent. for the unshelled seed. A statistical analysis of the figures leaves no doubt as to the significance of this difference.

The experiment shows, therefore, that shelling of the seed by removal of the capsule walls is necessary if satisfactory germination is to be obtained.

(2) *Germination of Fresh and Stored Seed Shelled by Dry and Wet Methods.*

The material used was drawn from a mixture of freshly-fallen capsules and seeds of a pure Manipuri jat, that used for fresh planting being collected 18 days after the first batch.

A period of 18 days storage was chosen, since this period approximates to the number of days previously taken by seed in transit from India to Malaya, while in the case of a local estate producing seed it might well represent the interval elapsing in the filling of a large planting order.

The four treatments involved may be summarized as follows:—

(i) Seed dry shelled and planted fresh.
(ii) Seed dry shelled and stored for 18 days before planting.
(iii) Seed wet shelled and planted fresh.
(iv) Seed wet shelled and stored for 18 days before planting.

All material was tested in water at each stage and only sinkers were used in the germination experiments.

This stage by stage testing enabled a comparison to be effected regarding the dry and wet methods of shelling seeds in respect of yield of sinkers, also information to be collected regarding the loss likely to be incurred in this respect as a result of storage. Tables II and III summarize the results obtained.

Table II.

Comparison of Recovery of Sinkers Following Dry and Wet Methods of Shelling.

Method of Shelling	Details of Treatment	
	Seed Planted Fresh	Seed Stored for 18 Days before Planting
	per cent.	per cent.
Dry method ...	57	34
Wet method ...	100	54

The results indicate in both cases a much better recovery of sinkers by the wet method of shelling.

Table III.

Reduction in Recovery of Sinkers on Storing Following Dry and Wet Methods of Shelling.

Method of Shelling	Sinkers in Original Seed	Sinkers in Stored Seed	Proportion of Sinkers in Stored Seed Calculated on Original Tested Sinkers
	per cent.	per cent.	per cent.
Dry method ...	34	11	4
Wet method ...	54	51	27

The figures indicate that seed cleaned by the wet method of shelling has superior storage properties to that cleaned by the dry method.

In the germination trials the seeds were sown in shaded sand beds following a randomized block plan with 25 seeds in each plot and three replications.

Germination was evident a few days earlier in those plots containing stored seed but there was no difference in the rate of germination due to the method of shelling. Table IV gives the results of the final germination count after 14 weeks.

Table IV.

Results of Germination after 14 Weeks of Tea Seed, Following Different Preliminary Treatments.

Method of Treatment	Mean Germination
	per cent.
Dry shelled and planted fresh ...	81
Dry shelled and stored before planting ...	73
Wet shelled and planted fresh ...	56
Wet shelled and stored before planting ...	80
Mean of all Treatments ...	73

A statistical analysis of the figures shows that the variations in germination are probably due to chance and not to the treatments. The mean germination of 73 per cent. is lower than that usually obtained.

With regard to the two methods of shelling, the wet method would appear to be preferable, since in addition to lower labour costs there is a higher shelling percentage of sinkers of superior storage properties.

(3) *Germination of Tested Sinkers which became Floaters after Storage.*

When the tested sinkers used in the two storage treatments in the above experiment were tested again after storage it was observed that many of the seeds which had become floaters had not decomposed internally but contained slightly yellowish and shrunken cotyledons. The viability of these seeds was tested by planting them in shaded sand beds in plots of 50 seeds arranged in a randomized block layout with three replications. Table V gives the results obtained on germination.

A statistical analysis does not reveal any significant difference between the two methods of shelling.

It may be concluded, therefore, that tested sinkers which became floaters after a short period of storage had not completely lost their viability but showed a germination of 35 per cent. or approximately half that of the original sinkers.

Table V.

Results of Germination after 14 weeks of Sinkers Becoming Floaters on Storage.

Method of Shelling	Mean Germination
	per cent.
Dry method ...	40
Wet method ...	30
Mean of Treatments ...	35

Summary of Conclusions.

The results of the different experiments may be summarized as follows:—

Tea Seed Production.

(1) Harvesting of tea seed at the Central Experiment Station, Serdang, is continuous throughout the year.

(2) Tea seed bearers at Serdang, approximately 9 years old and planted under high shade, have yielded at the rate of approximately 970 lbs. of tested sinkers per acre per annum.

Tea Seed Germination.

(1) Extraction of the seeds from the hard-walled capsules is necessary for good germination.

(2) The wet method of removal of the capsule walls described by Harler has been tried and adopted.

(3) The wet method of shelling gave a better recovery of good seed than the dry method.

(4) Seed cleaned by the wet and dry methods germinated equally well.

(5) Seed cleaned by the wet method showed better keeping properties than seed cleaned by the dry method.

(6) Tested sinkers, which became floaters after a short period of storage, gave approximately half the germination percentage of those seeds which remained sinkers.

References.

1. Greig, J. L. The Cultivation of Lowland Tea at the Central Experiment Station, Serdang. Special Bulletin, General Series, No. 29, 1937.
2. Harler, C. R. The Culture and Marketing of Tea.

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SWEET POTATO.

(*Ipomoea batatas*)

The sweet potato (Convolvulaceae), a trailing herbaceous perennial vine with edible starchy tubers, is commonly grown as a food crop in tropical regions in both hemispheres, with a range of cultivation extending into the sub-tropics.

The Chinese cultivate the sweet potato extensively in Malaya both for home consumption and for sale in the local markets; the vegetable has, however, never become popular with Europeans who prefer the ordinary potato. The plant is also grown widely by the Chinese for its foliage as a feeding stuff for pigs.

Description of Plant.

The stems of the plant grow to a considerable length and root freely at every node that rests upon the ground.

The sweet potato in common with the majority of the older cultivated crops displays many diversities of forms manifested as regards shape of leaf, colour of stem and flower, also colour both of skin and flesh of tuber. Thus, the leaves may be ovate, angular or lobed; the flowers may be white or pale pink. Similarly the colour of the flesh of the tubers may be either white, cream or yellow to purplish-yellow.

Although many varieties of sweet potato flower freely in Malaya, seed is rarely produced. This is due apparently to the flowers being to a great extent self-sterile. It is thought that in the few cases in which seed has been observed this must have been due to cross-pollination of different varieties effected through the agency of insects, possibly bees.

The tubers vary in shape, being either globular or cylindrical; the shape appears to be influenced to a certain extent by soil conditions. The weight of the individual tubers varies considerably, ranging from $\frac{1}{2}$ to 1 lb. or more.

Varieties.

Broadly speaking there appear to be four distinct varieties cultivated by the Chinese in Selangor. Apart from vegetative differences, to which reference has already been made, there is the important additional difference of period of maturation. Two of the varieties mature in about 3 months, whereas the other two take about 5 months.

The local variety most favoured for human consumption is one with large tubers 6 to 7 ins. long and 3 ins. in diameter, somewhat cylindrical in shape. The skin of the tuber is pale pink, the flesh yellow with orange blotches in the centre. The flesh is distinctly sweet. This type takes about 110 days to mature, and is said to be productive only on newly-opened or rich land.

Other varieties are grown on poor mining land, both for eating and for feeding to pigs. In one of these varieties the skin of the tuber is deep pink, the flesh being white. The maturation period is about 150 days. The flesh of the tuber is particularly firm, the flavour good, and it has a wider sale than any of the other varieties.

The young leaves from the vines are also eaten as 'spinach', the reddish or purple-leaved varieties are preferred for this purpose.

Some 15 years ago the Department made a number of introductions of sweet potatoes from the United States of America, West Indies, Java, and Philippine Islands, and these have been widely distributed throughout Malaya. The three introductions which merit special mention are North No. 3 (West Indies), Southern Queen (West Indies), and Samar Big Yellow (Philippine Islands). The period of maturation in each case varies from 120 to 150 days, and the tubers are all of good flavour. In the case of the first two the flesh is white, the third is yellowish-purple. Reference 1 should be consulted for further details.

From the point of view of a foodstuff a yellow variety is more beneficial than a white one owing to the presence in the former of carotene, the precursor of Vitamin A.

Soils.

The main requirement of the sweet potato is a friable soil that has been deeply cultivated to permit of a maximum tuber development.

The Chinese frequently grow the plant in very sandy soil, relying upon copious applications of pig manure to provide sufficient plant nutrients. Under such conditions the crop grows well and production of tubers is not adversely affected by excessive vegetative growth. A soil rich in organic matter invariably results in heavy growth of vines and small tubers. As will be explained later, this type of soil would be most suitable if the crop is being cultivated as a feeding stuff for live-stock.

Preparation of Land.

Before planting the land should be ridged, the ridges being spaced from 2 to 3 ft. from centre to centre and raised to a height of $1\frac{1}{2}$ to 2 ft. If the soil is particularly light in texture a dressing of well-rotted cattle manure at the rate of about 10 tons per acre should be worked into the soil shortly before planting.

Propagation.

The sweet potato is propagated from cuttings of semi-mature portions of the stem. Chinese cultivators always use apical cuttings, since earlier growth and heavier yields are obtained than with middle or basal cuttings. If insufficient tips are available for planting, middle cuttings may be used; basal cuttings, however, should not be planted. Philippine Islands agricultural practice confirms the above recommendation.

The cuttings should be from 9 to 12 ins. long with 6 or more nodes; the leaves and petioles are removed from the lower portion of the stem to be inserted in the soil. The cuttings are planted about 4 ins. deep with an average of 2 nodes below the soil. The usual distance of planting along the ridges is 15 ins.

The soil must be well pressed round the cuttings to prevent them from drying out; planting is therefore preferably carried out during wet weather when the cuttings should root readily.

When a small supply of tubers only is required, planting is undertaken at intervals of 2 to 4 weeks, to ensure continuous cropping. If dry weather prevails at the time of planting close attention must be paid to watering the cuttings until established.

In the case of the distribution of stock the use of small tubers is the most satisfactory method of propagation owing to the tendency of the cuttings to dry out, especially when transported long distances. The small tubers may be planted in beds of sandy soil and cuttings taken as they become available.

Cultivation.

Weeding is necessary in the early stages of growth, but once the plants become established the thick cover formed will prevent weeds growing to any appreciable extent. The trailing stems of the vines should be turned back on to the ridges periodically to inhibit rooting at the nodes which will result in a decrease in the size of the main root tubers.

Pests and Diseases.

No major pests and diseases of the plants have been observed.

There are a few caterpillars and three 'tortoise' beetles which feed on the leaves, but with regular inspection and collection none should cause extensive damage.

The most important pest is the weevil tuber borer, *Cylas formicarius* F., to which further reference will be made when discussing the question of harvesting the crop. The adult weevils attack the tubers, puncturing the skin and damaging the flesh. This pest becomes prevalent when sweet potatoes are grown on the same land twice in succession. The crop should therefore always be grown in a rotation. During the period of growth the tubers should always be kept covered with earth since exposed tubers encourage the deposition of eggs by the weevils. It is partly for this reason that deep cultivation is recommended, thereby ensuring deep rooting tubers.

Manuring.

Good results with this crop have been obtained at the Central Experiment Station, Serdang, by the application of cattle manure shortly before planting at the rate of 10 tons per acre.

Since it is generally not possible to obtain manure in large quantities its use on an extensive scale must be ruled out; further the cost of application would be prohibitive. Under ordinary circumstances the same may be said to apply to artificial fertilizers. On light soils at Serdang good results have been obtained by turning into the land a leguminous cover plant and adding 150 lbs. of rock phosphate and 50 lbs. of sulphate of potash per acre. The addition of potash is recommended in order to encourage the formation of carbohydrate (starch) in the tubers.

Owing to the low price of the foodstuff it would appear that the only economic method of cultivation is to grow the crop in association with animals, using the manure produced to maintain fertility of the soil.

Harvesting.

To ascertain whether the crop is ready for lifting a few tubers are examined. If they be cut through and the sap dries rapidly, forming a white crust, the plants are mature and the tubers may be lifted. The maturation period depends upon the

variety. It is important for the crop to be lifted as soon as mature, since if the tubers are left too long in the ground they become very liable to attacks by the weevil borer to which previous reference has been made.

The most satisfactory implement for use in harvesting the crop is the Assam fork, which ensures the tubers being lifted with the minimum amount of damage. The tubers after lifting should be cleaned of all soil and stored until required in a cool dry place.

Yields.

Yields of good cropping varieties in test plots at Serdang extending over a number of years have been found to average from 4 to 5 tons of tubers per acre. Under favourable conditions or on newly-opened land cultivated by Chinese smallholders yields up to 6 tons per acre have been recorded. The amount of fresh green matter available as a feeding stuff for livestock at the time of lifting is about 4 tons per acre.

Sweet Potatoes and Livestock.

As explained previously sweet potato foliage is used largely in pig feeding and there seems no reason for its use not being extended to cattle.

Cropping of the vines is carried out at intervals of 4 to 6 weeks, liberal applications of liquid manure being made after each cutting to induce fresh growth. No attempt is made to encourage the formation of tubers, the object being to secure the maximum amount of foliage.

Before feeding to the animals it is advisable to boil the foliage in water. Boiling destroys the enzyme or non-organized ferment which can break down any cyanogenetic glucoside present in the material and then liberate hydrocyanic (prussic) acid, which is poisonous. The water in which the material is boiled should be discarded. Reference 2 should be consulted.

Sweet potato foliage is a succulent feeding stuff, being comparatively rich in crude protein for material with such a high moisture content as the following figures show:—

	per cent.
Moisture	86.7
Crude protein	2.5
Crude fat	0.3
Nitrogen free extract* (by difference) ...	6.5
Crude fibre	2.5
Ash	1.5
Total ...	100.0

* Also referred to as carbohydrate (starch).

Uses.

The sweet potato is a most valuable food crop to the Chinese cultivator and suits admirably his system of small farming in Malaya.

For eating, the tubers are boiled shortly after harvesting. The keeping qualities of the tubers are not particularly good. Various methods have been tried in different countries, and in the West Indies storage in pits or clamps has given satisfactory results. Storage is not recommended, however, if the weevil tuber borer is prevalent.

The tubers may also be sliced and dried and then stored for subsequent use as required. On a small scale sun-drying is possible; on a larger scale artificial drying in a kiln would be necessary.

Except for slightly lower crude protein content, the sweet potato resembles the ordinary potato in composition as the following figures, calculated on the same moisture content basis, show.

	Sweet Potato per cent.	Potato per cent.
Moisture	72.2	72.2
Crude protein	1.2	2.3
Crude fat	0.5	0.3
Nitrogen free extract* (by difference) ...	24.3	22.9
Crude fibre	0.8	1.2
Ash	1.0	1.1
	100.0	100.0

Sweet potato tubers are also suitable for inclusion in livestock rations as a source of supply of carbohydrate (starch).

References.

The following articles to which reference has been made in the text, and which contain further information on sweet potatoes, are obtainable, price 50 cents each, from the Agricultural Economist, Department of Agriculture, S.S. & F.M.S., Kuala Lumpur.

1. The Experimental Cultivation of Sweet Potatoes at the Government Plantation, Serdang. *Malayan Agricultural Journal,* Vol. XV, No. 1, 1927.
2. Pig Keeping in Malaya. *Malayan Agricultural Journal,* Vol. XXVIII, No. 1, 1940.

* Also referred to as carbohydrate (starch).

CONDITIONS ON RUBBER SMALL HOLDINGS IN MALAYA.

1st Quarter, 1940.

Prepared by the Economics Branch of the Department of Agriculture, S.S. and F.M.S., in collaboration with the Field Branch of the Department.

Rainfall.

The quarter was abnormally dry throughout the Peninsula, and drought conditions existed in some localities.

Prices.

Tables I and II show prices paid for small-holding rubber during the quarter under review.

Uncouponed smoked sheet sold in Lower Perak at $17 per picul at the beginning of the year. The price rapidly fell to $13, and later fluctuated between $11 and $13. In the same District a steady premium of $1.50 per picul was offered for smoked sheet.

The value of coupons varied. In Lower Perak they were sold at $28 to $33 per picul equivalent. In Province Wellesley and Penang their value was $30, in Kedah from $26.50 to $31, and in Kelantan $25.

Production and Quality of Rubber.

Production of rubber on small holdings during the quarter is shown in Table III and it will be seen that it was almost double the production in the corresponding quarter of 1939. This considerable increase, which principally took place in January, was probably due to several factors. The market was high and small-holders probably took advantage of this fact to obtain the highest yields possible before "wintering" set in. The release for the 1st quarter was increased by 5 per cent., and in addition a further release of 5 per cent. in respect of the 4th quarter of 1939 was given to small-holders. This additional release was made after the 4th quarter's coupons had been issued and therefore had to be held over until this year.

The Pahang report again mentions the tendency to dispose of sheet as quickly as possible, but in the Kuantan District, as usual, the sheet is mostly smoked before sale, and the practice of smoking is developing slowly in the riverine mukims of Pekan. The quality of the sheet entered in the recently held rubber competitions in Pekan and Temerloh was high. The report also points out that the knowledge of how to produce good smoked sheet would appear to be quite widespread, and the fact that much of the sheet offered for sale is of low standard is due to factors other than mere ignorance.

Table I.

Lowest and Highest Rubber Prices Paid by Local Rubber Dealers.

(In Straits dollars per picul of 133 1/3 lbs.)

1st Quarter 1940.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore	Kelantan
				JANUARY					
Smoked sheet	46.00-49.20	42.00-51.50	44.00-48.90	44.00-49.00	43.50-49.60	47.00-49.50	42.00-51.40	42.00-49.00	41.70-47.00
Unsmoked sheet	44.50-49.00	41.00-50.00	42.00-46.90	41.00-47.00	42.00-49.00	46.00-48.70	41.10-50.00	39.00-48.00	39.50-45.00
Scrap	31.00-38.00	29.50-33.00	32.00-36.00	—	—	37.00-41.00	33.00-37.00	32.00-39.40	28.00-33.00
				FEBRUARY					
Smoked sheet	46.30-48.00	42.00-47.50	44.50-46.80	43.00-47.00	40.00-46.50	46.00-48.50	44.00-49.80	42.00-51.00	41.80-45.00
Unsmoked sheet	45.00-48.00	40.00-45.70	42.00-46.25	41.00-46.00	39.00-45.10	44.00-46.50	41.50-48.40	41.00-47.30	38.50-41.50
Scrap	30.00-35.00	36.00-38.50	32.00-36.00	—	—	36.00-38.50	31.50-38.00	34.00-39.70	27.50-31.00
				MARCH					
Smoked sheet	44.50-47.00	42.00-46.50	44.00-46.50	40.00-46.50	42.00-46.00	45.00-48.50	42.30-49.00	41.00-49.00	39.70-44.00
Unsmoked sheet	44.00-47.00	40.00-45.00	42.00-47.15	39.00-45.00	40.00-44.70	44.00-46.50	40.60-47.60	40.00-47.00	37.50-42.20
Scrap	30.00-34.50	33.00-35.00	32.50-36.50	—	—	35.50-40.00	30.00-38.00	30.00-41.30	26.50-30.00

Table II.

Mean of Lowest and Highest Rubber Prices Paid by Local Dealers at a number of Centres in each State.

(In Straits dollars per picul of 133 1/3 lbs.)

1st Quarter 1940.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore	Kelantan
				JANUARY					
Smoked sheet	46.25-48.60	44.15-47.79	45.50-46.48	45.35-48.42	44.93-48.19	48.17-49.00	44.83-47.63	44.75-47.75	42.75-46.62
Unsmoked sheet	45.50-48.08	42.31-45.12	43.63-45.73	42.90-46.50	43.70-45.80	47.33-47.90	43.15-46.12	43.92-46.41	40.50-45.00
Scrap	32.67-34.67	29.50-33.00	32.00-36.00	—	—	38.50-39.50	34.00-35.12	34.79-37.26	29.00-32.50
				FEBRUARY					
Smoked sheet	46.65-47.40	43.50-45.82	45.25-46.13	44.00-47.00	43.23-45.84	47.00-47.72	44.33-46.95	43.87-46.11	41.90-44.75
Unsmoked sheet	45.34-47.03	41.66-43.79	43.12-45.06	42.75-45.40	41.56-43.36	45.00-45.13	42.63-45.58	42.29-44.72	38.50-41.00
Scrap	31.67-32.50	36.00-38.50	32.00-36.00	—	—	36.83-37.67	33.50-35.50	35.25-37.15	28.50-30.00
				MARCH					
Smoked sheet	44.75-46.75	43.47-45.28	44.85-45.33	42.70-45.18	43.62-45.76	46.17-47.00	44.20-46.15	42.77-45.73	41.10-43.25
Unsmoked sheet	44.50-45.88	41.61-43.12	42.80-44.21	40.90-43.40	42.16-44.04	44.83-45.67	41.40-44.53	41.65-44.75	39.10-41.35
Scrap	32.50-33.17	33.00-35.00	32.50-36.50	—	—	36.67-38.00	33.00-35.55	34.64-36.70	27.50-29.50

Table III
Production of Rubber on Small Holdings.
(in tons)

	Total 1939	1st Quarter 1939	1st Quarter 1940
Federated Malay States ...	51,769	10,875	22,637
Straits Settlements ...	9,950	2,123	3,781
Unfederated Malay States ...	54,850	11,450	21,973
TOTAL MALAYA ...	116,569	24,448	48,391

In Kelantan the construction of smoke-houses continued. At the end of the quarter there were 86 smoke-houses completed, 33 under construction, and 40 projected. In Malacca, smoke cabinets have been left idle and no new ones have been erected. Little or no smoked sheet is prepared in Malacca by the Malay small-holder, who considers that the small premium paid for smoked sheet does not justify the labour involved.

General Conditions on Holdings.

"Wintering" commenced in late January or early February, and was generally more rapid than in previous years on account of the dry weather.

The Pahang report states that the standard of upkeep throughout the State is quite good irrespective of the nationality of the small-holder. The trend is away from clean-weeding, and holdings are now mostly under cover of some nature, either natural or deliberately sown, the latter more especially on new or replanted lots, the seed often being obtained through the Asiatic Rubber Instructor concerned.

The Kedah report states that no ill effects from the drought have been observed.

Tapping.

The results of the quarterly survey of small holdings out of tapping are summarized in Tables IV and V. It will be seen that whereas in some States more holdings were being tapped, in other States the reverse was the case. This variation is principally due to later "wintering" in some localities and to padi harvesting. The exceptionally dry weather also reduced tapping.

In Bentong, Pahang, the medium and small Chinese holdings have, in some cases, adopted alternate daily tapping in view of the controlled supplies of coagulants.

Table IV.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres at the end of March, 1940.

PERAK			
District	Total Tappable area	Total area untapped	Percentage
Batang Padang	36,187	6,900	19
Kinta	38,874	7,000	18
Kuala Kangsar	92,166	23,000	25
Upper Perak	15,590	5,000	32
Larut & Selama	43,132	1,300	3
Krian	9,408	8,200	87
Lower Perak	26,735	9,400	35
Dindings	9,873	3,100	31
	271,965	63,900	23

SELANGOR			
District	Total Tappable area	Total area untapped	Percentage
Klang	16,143	1,800	11
Kuala Langat	23,881	7,400	31
Ulu Langat	45,012	22,100	49
Ulu Selangor	31,463	17,300	55
Kuala Lumpur	20,277	10,700	53
Kuala Selangor	8,417	1,900	23
	145,193	61,200	42

NEGRI SEMBILAN			
District	Total Tappable area	Total area untapped	Percentage
Seremban	23,639	16,800	71
Tampin	21,896	7,700	35
Kuala Pilah	31,832	20,400	64
Jelebu	9,097	1,500	17
Port Dickson	11,133	7,800	70
	97,597	54,200	56

PAHANG			
District	Total Tappable area	Total area untapped	Percentage
Raub	10,534	3,600	34
Kuala Lipis	15,457	3,100	20
Bentong	12,224	1,800	15
Other Districts†	46,373	10,200	22
	84,588	18,700	22

MALACCA			
District	Total Tappable area	Total area untapped	Percentage
Central	14,093	4,600	33
Alor Gajah	30,838	10,200	33
Jasin	25,286	5,800	23
	70,217	20,600	29

PENANG & P. WELLESLEY			
District	Total Tappable area	Total area untapped	Percentage
North	3,549	1,300	38
Central	10,785	5,900	55
South	8,936	700	8
Penang	15,822	500	3
	39,092	8,400	21

SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage
Singapore	20,115	200	1
	20,115	200	1

JOHORE	350,007	38,500	11
KEDAH	102,126	26,500	26
KELANTAN	49,133	17,200	35
PERLIS ‡	2,916		
TRENGGANU ‡	29,836	7,500	25

The percentage of areas out of tapping in December, 1939, was as follows:—Perak 14, Selangor 44, Negri Sembilan 57, Pahang 32, Malacca 30, Penang and Province Wellesley 12, Singapore 1, Johore 9, Kedah 6, Kelantan 28.

†Estimated from percentage for other Districts in the State.

‡Estimated from percentage for rest of Malaya.

Table V.
Comparisons of Areas of Rubber Small Holdings Out of Tapping

	March, 1939		December, 1939		March, 1940	
	Acres	Per-centage	Acres	Per-centage	Acres	Per-centage
F.M.S. ...	315,500	52.6	184,400	30.7	198,000	33
S.S.	51,900	40.0	25,800	20.0	29,200	22
U.M.S. ...	164,700	30.8	58,300	9.1	89,700	17
Malaya ...	532,100	42.0	268,500	21.0	316,900	25

Planting.

The Perak Central report states that considerably more small-holders appear to be taking advantage of the replanting scheme, and the area of old rubber being felled is increasing rapidly. A considerable number of enquiries about the supply of budwood of approved clones continue to be received, and it now seems that a very high percentage of the area to be replanted will eventually be budgrafted if the owners carry out their present intentions.

Unfavourable weather conditions throughout the quarter slowed down planting of old and new areas.

Asiatic Rubber Instructors continued to emphasize the importance of using high-yielding planting material, and in Pahang, it is reported, the interest of small-holders, particularly Chinese, has unquestionably been aroused. The Instructors have also assisted in obtaining budded stumps and budwood for small-holders. The Pahang report continues that there is a distinct liking for clonal seed in spite of the fact that assessment may suffer later. Reports indicate that towards the end of the year, when seedlings reach buddable size, there may be a fairly big demand for budwood. Budding classes were held in several centres in Pahang and were popular.

The Negri Sembilan report states that a considerable percentage of small-holders are now undertaking replanting with budded stock.

Pests and Diseases.

Some cases of mouldy rot were reported, but the extremely dry weather conditions very considerably checked the incidence of this disease. Mild attacks of *Oidium Heveae* were experienced in several parts of the Peninsula. In Perak Central a holding was discovered to be attacked by a thread blight, probably a species of Marasmius.

A Johore report states that the position in relation to soil erosion has been greatly improved as a result of special conditions attaching to approved applications for land for new planting. Apart from measures of compulsion the value of such work is slowly being realized by small-holders.

Some cases of root diseases continue to be found, but attacks are usually confined to one or two trees.

The Negri Sembilan report also states that the position in regard to soil erosion is showing gradual improvement, particularly where new or replanting is being undertaken. There is little difficulty in persuading small-holders to terrace their land and plant covers, providing their financial position is sufficiently sound.

General.

The Field Branch of the Department of Agriculture in co-operation with the Land Offices continued the distribution of coagulants. In the State of Selangor, the Department distributed 140,000 and 240,000 fluid ozs. of coagulant during January and February respectively. Distribution of acid is now again in the hands of licensed dealers and retailers and the Department has been relieved of this additional work.

The Rural Lecture Caravan visited Perak during the quarter. Lectures on the cultivation and manufacture of rubber were given at all centres in the Perak Central Circle by the Asiatic Rubber Instructor, Parit.

Demonstrations on budgrafting were given at the Ayer Tawar Agricultural Station, Perak, in February; 156 small-holders, both Malay and Chinese, attended.

During the tour of the Caravan in the Perak South Circle demonstrations of coagulation and smoking were given. Propaganda to encourage smoking was concentrated at Balum Bidai as it was thought that it should be profitable there.

At Kuala Kalumpang, Selangor, a headman and two small-holders are erecting a smoke-house of the Devon type which will cost approximately $350 and have a capacity of 800 sheets. It is proposed to market the sheet co-operatively.

The Johore Central Circle report states that the activities of a Singapore firm in the purchase of latex from small-holders appear to be extending. The Johore North report also comments on the greatly increased sale of latex by small-holders. Up to the end of the quarter 14 agencies had been established at various centres. Some of this latex also is sold to Singapore, but the greater proportion of it is purchased by a local group of estates.

Small-holders were receiving from the Chinese agents 14 to 15 cents per kati for latex, based on the dry rubber content, the "Chee" system being used for this calculation. This system is briefly the coagulating of a small known volume of the latex. The latex was then disposed of at the Singapore price for uncouponed smoked sheet less the export duty. It was calculated that agents were thus making about 2 cents per kati profit.

At Bentong, Pahang, a demonstration area illustrating measures to be taken against soil wash has been prepared, and visits of parties to the area are being arranged with the co-operation of District Officers.

Asiatic Rubber Demonstrators were appointed in Pekan and Kuantan, Pahang, during the quarter. Numerous rubber competitions were held in various mukims in Pahang, and attracted an increased number of entries. The quality of the exhibits showed general improvement.

Some reports consider that the small-holder is much better off at present with higher prices for rubber and controlled prices for his requirements. Other reports consider that the increased cost of living offsets the appreciation in the price of rubber. The Pahang report suggests that it is not without point that rent collections generally have been very satisfactory in all mukims in which they have been held .

Selected Article.

HISTORY OF SHIFTING CULTIVATION IN BRUNEI 1906 - 1939 *

Arnot and Smith ([1]) and Spurway ([2]) have described the extent of damage done in Brunei and Sarawak respectively by the practice of growing hill rice by the system of shifting cultivation, or *tebasan* as it is known locally, and have discussed the means by which the trouble may be lessened. Considerable advance has been made in recent years in the control of *tebasan* in Brunei, and it is thought that a historical account of the practice, the measures taken to control it, and their result, will be of value.

As in other parts of Malaya, rice is the staple food of the native population of the State; until very recent times the requirements of the peasant families were obtained solely by the agricultural " system " of shifting cultivation. In good harvest years there was sometimes a small surplus for sale, but in lean years the home grown rice had to be supplemented by purchases of the imported article, or, if money was lacking for this, the families had to live on short rations until the next harvest. It has never been possible to supply the full requirements of the townspeople with local grown rice, and considerable quantities are imported yearly, the total value of rice imports for the 20 year period 1919-1938 amounting to $3,996,317.

At the present time it is of particular importance that countries should not have to rely on imported supplies of their staple food, and any action which will tend to increase local production automatically commends itself. The most obvious action in Brunei is to divert all the energy which is expended annually on the production by shifting cultivation of a low-yielding crop of hill rice, particularly subject to loss by drought and pests, to the growing of a wet rice crop, which will yield several times more per acre and which is less subject to loss. Quite apart, therefore, from the terrible damage done to the forests and to the soil—and it has been emphasized by Sir Frank Stockdale ([3]) that high land soils throughout Malaya are of low fertility in the first instance—increased yield is sufficient reason in itself to justify (if this were needed) all the trouble that has been, and is being, taken to control shifting cultivation.

In 1906, by a supplementary agreement to the treaty of 1888, the Sultan of Brunei undertook to accept a British Officer to be styled Resident, and from that date it is possible to obtain much information of great interest from Annual Reports. In the first report of 1906 appears the following: " Large cargoes (of rice) are brought in by every schooner": in 1908 it is said that "there is no attempt at permanent cultivation (of rice); a fresh clearing is felled, planted, harvested and abandoned annually": in 1911 it is reported that " the native still hankers after rubber," and that " the padi crop was a miserable failure." Time

* By C. O. Flemmich. *The Malayan Forester*, Vol. IX, No. 1, January, 1940.

and again throughout these old reports it is stated that the padi crop was "a miserable failure," was "almost entirely a failure," or was "utterly ruined by drought," and each time does the import of rice leap up in response; in 1919, owing to the failure of the padi crop, the value of imported rice rose to the huge figure of $312,820, compared with $193,772 in 1938.

The utter failure of the crop in 1919 seems to have made a certain impression on the natives, for it is reported that 'there is a disposition, even amongst such staunch conservatives as the Kedayans, to question whether it is not possible to improve on their present method--- a method under which there is no cultivation and the harvest depends on the hazard of flood or drought." The 1928 report, however, states that "the area under wet rice is increasing but slowly," so it would seem that the lesson of 1919 was quickly forgotten, and until 1930 there appears to have been no real movement on the part of the natives of any tribe or district to abandon dry for wet padi cultivation.

Beginning with the 1929/30 season the Government paid more and more attention to the encouragement of wet padi growing in certain Kedayan kampongs in Brunei district, and thereafter a slow but steady increase in the area under wet padi is reported; in other districts no marked change started till much later. Encouragement first took the form of propaganda, coupled with the waiving of land rent for 3 years on land taken up on title for wet padi (the effect of this remission of rent is discussed in a later paragraph), and was followed by the issue of padi cultivation rules, and the formation of demonstration and test plots, when the nucleus of an Agricultural Department was formed in 1933. Early in 1937 a European officer of the Malayan Agricultural Service was seconded for service in Brunei, and since then demonstration and propaganda by that Department has been responsible for greatly improved methods of cultivation and a steady increase in favour of wet padi cultivation.

As far as the permanent cultivation of wet padi is concerned, it will be seen from the foregoing that the year 1929/30 marks the beginning of progress in this matter. I do not mean by this that there was a sudden awakening to the fact that it was fundamentally wrong to grow rice by shifting cultivation if a prosperous agricultural State was to be formed, or that nothing was done to increase wet rice cultivation prior to 1929/30. Past reports show that the facts were fully appreciated by Government (if not by the native), and the report of 1910 deals at length with suggested land settlement plans and measures for controlling shifting cultivation; one of these suggested control measures was the State-aided immigration of families from Banjarmasin so that the Brunei native could be shown that "each acre of wet padi land should produce 400 gantangs of heavy rice, against the miserable crops of 50 gantangs of light hill-padi." Nothing came of it however. The facts were fully appreciated, but, until oil was found in commercial quantities in 1930, funds were lacking and the staff was hopelessly inadequate. All efforts to improve matters were therefore still-born. Another factor which, in the writer's opinion,

had an even greater retarding effect on progress, and which had a very bad influence on such measures as were taken to control shifting cultivation, was the "Poll-tax" system of taxation.

Prior to the introduction of the Residential system in 1906, there was neither land law nor regulated taxation in Brunei. The Kedayans and other interior races (the agriculturalists) were required to pay tribute "in kind" to the Sultan, or other chiefs, each year in the form of animals or agricultural products. The payment of this tribute allowed them to occupy land for the cultivation of foodstuffs (chiefly rice) free of other charges. The tribute was collected from adult males only, and could be commuted by a cash payment ranging from $1 to $2 per annum. From 1906 onwards the tribute was replaced by a "Poll-tax" of $2 per adult male per year, and payment carried with it the right to occupy an unlimited area of State Land, free of charge, for padi cultivation. Exemption from the tax was granted to persons taking up land under permanent title, but, in the case of padi-land, the rent and fees for obtaining a permanent title came to something like $12 for 5 acres and under, so the people naturally did not avail themselves of the exemption. The tax was collected by headmen, and the following extract from the 1912 report tells its own story: "From poll-tax a sum of $5,134 was received, against an actual collection of $4,463 in 1910. This is significant as it was in 1910 that land alienation, producing land rent in place of poll-tax payments, commenced. It may be stated that at least 500 persons who formerly paid a poll-tax now pay land rent in lieu thereof, and the fact that the revenue from the older tax shows an increase is proof that until recently the various headmen were not averse from making false returns of the numbers of their tribes. The census of 1911 may have contributed not indirectly to their improved honesty. I still repeat that it will be a satisfactory day when the word "poll-tax" is no longer seen among the revenue producing items of the State." In 1933, apparently as the result of the depression, the tax was reduced to 50 cents per head, though this action made it even more attractive to the native to continue paying the tax rather than obtain exemption by taking up land on permanent title. The reason for this was that, although the terms of alienation of padi land had been made more favourable in 1929 by waiving premium and granting the first 3 years rent free and rent thereafter at 40 cents per acre, the initial cost of *obtaining* a title (survey fees, boundary stones etc.) was about $8.80 for 5 acres and under, and this represents a very large sum to a peasant. In 1935, partly as a result of frequent urging by the Forest Department that better control over shifting cultivation *must* be obtained if the forests and soil of the State were not to be further ruined, the question of abolishing the tax entirely was investigated. During this investigation it was found that the people preferred that the tax be raised to its pre-depression level of $2 per head rather than accept the alternative, which was the licensing of dry padi areas at a fee of 50 cents per acre. It was learnt that this surprising preference was based upon the erroneous assumption that the payment of the higher tax would guarantee to the natives the unrestricted right to fell jungle (virgin or otherwise) when and where they pleased, and that the provisions of the newly

enacted forest law, which was beginning to have its effect, would be abandoned. Deputations came from various tribes (Dyaks, Muruts, Kedayans etc.) and they were unanimous in their declaration that the proposed collection of the 50 cents Temporary Occupation Licence fee represented a very real financial hardship. Actually, a small family would require not more than 5 acres which at 50 cents per acre would cost them only $2.50, whereas in such a family there would be at least two adult males who, at $2 per head, would have to pay $4 poll-tax. In other words, what the people were after, though it cost them considerably more in money, was a return to the good old days when their shifting cultivation activities were uncontrolled. They did *not* get away with this, and the poll-tax was discontinued in 1936, when the payment of a Temporary Occupation Licence fee of 50 cents per acre for dry padi land was made compulsory. In the same year, as an added inducement to abandon the cultivation of hill-padi, the rent on wet-padi land taken up on permanent title, which in 1929 had been waived for 3 years from the date of alienation, was waived for a further 2 years, making 5 in all. Except, therefore, for the Kedayans in a limited number of kampongs in Brunei district (where the change started in 1929/30), there was no real movement to check shifting cultivation in other districts until the poll-tax was abolished in 1936.

I have been unable to trace any legislative measures for controlling shifting cultivation prior to 1928. In that year a rule was made under the Land Code which prohibited the felling of any virgin jungle or *belukar* over 10 years old, but owing to the hopelessly inadequate staff, and to the ingrained conviction of the people that the payment of poll-tax carried with it the right to make their clearings for padi when and where they liked, it was quite impossible to enforce the rule. That it was not enforced in any way was found by Durant ([4]) in 1932, when he examined the forests of Brunei and reported that recent clearings had destroyed some magnificent stands of timber. As a result of Durant's report, an officer of the Malayan Forest Service was seconded to Brunei early in 1933, and immediate steps were taken to control shifting cultivation by means of legislation and propaganda, as opposed solely to persuasive measures.

The first step was to adopt forest rules on the lines of those in force in the Federated Malay States, where the felling of any tree on State Land is prohibited. To have enforced the rules from their inception would, however, have been impossible. In 1933, therefore, the practice of felling *virgin jungle* for rice planting was forbidden entirely, and clearings were confined to the very extensive areas of *belukar*. A considerable proportion of this *belukar* is attributed to the Muruts, a tribe that existed here in large numbers more than 40 years ago, but is now reduced to a few hundred. Some of these old clearings are well on the way to reverting to the original forest, so throughout 1934 and 1935 clearings were confined to *belukar* under 20 years old.

While the question of abolishing the poll-tax was being examined in 1935, no less than 117 persons were prosecuted under the forest rules for felling virgin jungle.

In 1936 it was deemed advisable to restrict still further the activities of the shifting cultivation, so the permissible maximum age at which *belukar* could be felled for planting hill rice was reduced to 10 years.

Between 1933 and 1938, in addition to numerous prosecutions under the Forest Rules against shifting cultivators, District Officers and forest subordinate took every opportunity to explain to the people why it was necessary to control shifting cultivation, and this, coupled with propaganda by the Agricultural Department, and with demonstration of correct methods of cultivation, did much to turn the thoughts of the people from dry to wet padi.

At the end of 1938, at the suggestion of the Agricultural Officer that still more should be done by Government to encourage wet padi cultivation, the question of fees payable on the two types of land was closely examined. It was decided that, even though the premium and rent of 40 cents per acre payable on wet-padi land had been waived, as from 1936, for a period of 5 years from the date of alienation, the other charges for obtaining a title (registration, survey fees, boundary stones etc., amounting to about $8.80 for 5 acres and under) were a deterrent to the cultivation of wet-rice, when, by payment of 50 cents per acre, people could obtain as much land for hill-padi cultivation as they wished. The charges for obtaining title to wet padi land were therefore still further reduced, and at the same time the licence fee for hill-padi land was increased. Under the revised charges the annual rent of 40 cents per acre on wet-padi land continued to be waived for 5 years from the date of alienation, but in place of $8.80 a charge of only $4 was made for obtaining title and, if ready cash was not available, this sum could be paid at the rate of $2 down and the balance within one year. If the people still did not want to avail themselves of these extremely easy terms, they could continue to cultivate hill-padi, but at an annual rent of $1 per acre instead of 50 cents. If 5 acres is taken as the unit occupied by a small family, it will be seen that, over a period of 5 years, the only payment in respect of wet padi land will be $4 against $25/- for dry-padi cultivation; this compares with the old charges of $8.80 cash-down for wet-padi land, against $12.50, at $2.50 per year, for dry-padi. Although the new charges have not been in force for a year, land offices are being swamped with applications for wet-padi land. In the Labi district, where there is some magnificient land for wet rice cultivation, steps have actually been taken to forbid entirely the planting of hill-padi during the 1939/40 season. It is too early yet to say how the native will react to this, but if it is successful it is possible that it will be applied to area after area throughout the State.

As an additional inducement Government has arranged that anyone holding a title for wet-padi land can purchase buffaloes for cultivating the land by making a minimum cash payment of $5 and paying the rest of the debt within 5 years. The buffaloes are purchased by the Government from British North Borneo, where there is a surplus, and the demand is so great that each shipment could be sold many times over before arrival. The cost landed in Brunei is about $35 per head, and so far over 300 animals have been sold in this way.

In conjunction with all the other methods that have a direct or indirect influence on the control of shifting cultivation, Government has provided funds for carrying out small irrigation schemes. The work of cutting drains etc. is carried out by the natives themselves, and it frequently happens that on receiving payment at the end of a particular job of work, the native will go straight to the land office and invest part of his wages in a block of land through which he has just been cutting a drain. It is estimated by the Agricultural Officer that well over 1,000 acres of wet padi land have been opened up in this way in 1939.

References.

(1) Arnot, D. B. and Smith, J. S. Shifting Cultivation in Brunei and Trengganu. *The Malayan Forester;* Vol. VI, 1937.

(2) Spurway, B. J. C. Shifting Cultivation in Sarawak. *The Malayan Forester;* Vol. VI, 1937.

(3) Stockdale, Sir Frank, K.C.M.G., C.B.E. Report on a Visit to Malaya.

(4) Durant, C. C. L. Report on the Forests of Brunei. Government Printing Office, Singapore, 1933.

Notes and Comments.

SETTLEMENT OF INDIANS ON THE LAND.

A good opportunity of judging the standard of agricultural practice reached by Indians settled on the land in Malaya was provided when an invitation was received from Mr. R. Paton, Permatang Estate, Morib, to assist in judging the holdings established on that estate* on the occasion of the Estate Sports Meeting held on 17th February, 1940.

The scheme adopted on this estate is to grant allotments of 1 acre to approved aged members of the labour force who wish to retire and settle on the land in Malaya not far from the younger members of the family who are still working on the estate.

The underlying principle of Mr. Paton's scheme is the maintenance of a small number of livestock on each holding for the conversion of lower-grade produce into pork, mutton, beef or milk and at the same time to produce livestock manure for the maintenance and augmentation of soil fertility of the holdings.

The settlers are fortunate in being permitted to graze cattle and goats on the estate and house them at night on the allotments. In this manner the animals transport manurial residues from the estate to the holdings, since most of the fodder is derived from the estate and about half of the dung is dropped in the sheds at night and can be used on the allotments.

To date 37 1-acre allotments have been made; the revenue received during the year 1939 in the form of cash sales amounted to $2,016. It must be appreciated that this figure is by no means the total value of the produce obtained since the allotments are providing a proportion of the vegetables consumed by the holders and younger members of their families on the estate. Further, the figure does not take into account the increased capital value of the growing and multiplying livestock. Present numbers of livestocks are 12 cattle, 55 pigs, 95 goats and 200 fowls.

The writers were particularly struck by the keen and industrious spirit shown by the allotment holders during the past year in the development of their holdings. Although we understand that Mr. Paton is not giving the personal supervision to the area which he did in the past, since he considers, and rightly so, that the settlers should become more and more self-reliant there is no doubt that his efforts have not been wasted. In the large majority of the holdings, and particularly in the case of the one to which we had no hesitation in awarding the first prize there was evidence that the holders had derived considerable benefit from the instruction provided in the past. In other words the holder is learning the art of rotating crops and of making the best use of his land.

As far as agricultural practice is concerned there are only a few criticisms to offer and these should be taken in a constructive sense:

(*a*) Even where the number of animals on the holding was very small, possibly only one pig, there was a tendency to neglect the cultivation of vegetables and to concentrate on what might be termed cash crops, such as tapioca and sweet potato, to a far greater extent than necessary.

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* *Malayan Agricultural Journal*, Vol. XXVI, No. 11, November, 1938, page 451.

Vegetables can be used directly, whereas the other crops must be sold and the proceeds of the sale used for buying vegetables in the local market. Every effort should be made to impress upon the settler that it is better to make himself independent as far as possible in the matter of food production for himself and his family. That the settlers are capable of growing good vegetables was amply demonstrated at the Vegetable Show held later in the afternoon while the Sports Meeting was in progress.

(*b*) There was a tendency to neglect the proper conservation of farmyard manure. Manure when exposed to the weather will soon deteriorate in quality; for example, the drain from the pig stye should not be just below the edge of the lean-to roof, otherwise the first heavy fall of rain will soon dilute the contents of the drain to vanishing point as far as manurial value is concerned.

(*c*) Orderly planting of vegetables should be encouraged. Quite a few of the holdings provided a wonderful medley of crops; it is considered better results would be obtained if these were concentrated in definite areas.

In the case of livestock, there was a tendency to over-populate the holding with the result that the amount of food available was insufficient to maintain the animals, principally pigs, in prime condition. There is no doubt that as time passes and the settlers become more experienced they will realize that if the best results are to be obtained the animal population must be correlated with available foodstuffs. As an object lesson we would draw attention to the excellent condition of the pigs in the holding to which the first prize was awarded.

Considering the materials available many of the settlers have shown marked skill and ingenuity in erecting cool and comfortable houses, several of them possessing features that might well be considered by those concerned in the design and construction of detached dwellings.

C.D.V.G. & T.D.M.

AGRICULTURAL ADVISORY MEETING.

17th April, 1940.

A meeting of the Agricultural Advisory Committee was held at the Department of Agriculture. Kuala Lumpur, on 17th April, 1940, under the chairmanship of the Adviser on Agriculture, Malay States.

Amongst the more important subjects discussed and reviewed at the meeting were:—Pineapple canning: Tea experiments and the sale of tea in the United Kingdom; Arrangements for supply of clonal rubber to small-holders; Supply of coagulants to rubber small-holders; Fixation of prices of palm oil and copra; Classification of coconut oil for Imperial Preference; Rice storage; World trade in oils and fats; and Control of pineapple imports into the United Kingdom.

ANNUAL PRIZE DISTRIBUTION, SCHOOL OF AGRICULTURE, MALAYA.

The annual prize distribution at the School of Agriculture, Malaya, was held on 12th April, 1940. Amongst those present, in addition to the staff and students, were the Hon'ble the Federal Secretary (Mr. H. Fraser), the Hon'ble the Adviser on Agriculture (Mr. W. N. C. Belgrave) and the majority of the members of the School Advisory Committee.

The Principal of the School (Mr. G. E. Mann, M.C.) extended a welcome to the visitors and outlined the activities and progress of the School during the past year.

Progress of the School.

Mr. Mann reminded his listeners that the School had now completed its ninth academic year, with 66 students and pupils in residence, 48 in the two year and 18 in the one year course, all of whom except 25 first year students were leaving the School that day. Present indications were that between 70 and 75 students would be in residence when the School reopened in May. It had been necessary to refuse admission of a number of private students during recent years owing to lack of accommodation, and this year more applicants had been refused for this reason than would have filled a complete new class. This, the speaker thought, indicated the popularity of the School as a centre of vocational training, but he considered it unfortunate that the accommodation was so limited, as he felt that similar applications would be no less numerous in the future.

Scholarships.

The provision of government scholarships remained unchanged, there being 24 in the two year and 9 in the one year course. Competition for this year's major scholarships was keener than last year but the reverse was the case with minor scholarships.

Prospects of Employment.

Excluding those boys leaving that day, the Principal stated that 256 students had passed through the School, of whom 189 were known to have found employment. Of these, some 20 were working on estates, and the speaker had received very satisfactory reports about the majority of them. The Rubber Research Institute, however, remained for the present the biggest employer as it had taken between 35 and 40 of the old boys and would take 6 or 7 more this year. Two Chinese students would start work on an estate in Johore in May and other offers from estates would no doubt be received during the next few months. The requirements of the Department of Agriculture were not quite certain, but that Department would probably have one or two vacancies. He considered it safe to say that any student receiving the diploma of the two year course that day would find a post in the near future if he needed one.

Diplomas and Certificates.

During the past year the regulations governing the award of diplomas and certificates had been tightened up by making the majority of subjects obligatory. Students could not gain an award unless they had passed in each of these subjects, while the remaining subjects would count for competitive purposes only. A candidate who failed to gain an award at the end of the school year could present himself for re-examination at a future date.

The McLean Commission.

The Principal referred to the report of the McLean Commission on Higher Education which had been recently received. He stated that the report expressed the view that the School was doing what was required and that there was no case at present for higher agricultural education in Malaya.

School Activities.

Mr. Mann stated that, on the whole, discipline had been satisfactory. He regretted that there had been a further decline in the membership of the Old Boys' Society, but it must be remembered that it was not an easy Society to keep together satisfactorily, for its members were scattered and functions such as reunions were practically impossible. He hoped, however, that every student leaving that day would at least keep in touch with the School by means of an occasional letter.

In conclusion, the Principal paid a tribute to his staff and to others who had helped the School in one way or another during the past year, particularly the staff of the Central Experiment Station and those officers of the Rubber Research Institute who were responsible for the organization and conduct of special courses at the Institute's Experiment Station at Sungei Buloh designed to supplement the training which students had received at the School.

Speech by the Hon'ble The Federal Secretary.

In the course of his speech Mr. Fraser stressed the point that to-day, with the Empire at war, Malayan agriculture was even more important than in times of peace. The United Kingdom relied upon this country for essential supplies of rubber and to a less degree of copra and palm oil and, thanks to the British Navy, these essential supplies were assured.

He reminded his audience, however, that the production of food for local consumption was also important and he felt sure that they could assist by propaganda and advice in the effort to produce more food. He did not suggest that anyone should plant food crops for which there was no market, but he felt strongly that the general health of the community would be improved if one ate more fresh vegetables and for this purpose every man who owned land should make it his business to plant at least sufficient vegetables for himself and his family.

He reminded the boys that the award of the School diploma and certificate merely meant that they had a sound grounding in the principles and practice of agriculture but that this knowledge, backed by further technical experience, would increase their usefulness as citizens year by year.

Address in Malay.

Mr. Swaine, Deputy Director and Adviser on Education, terminated the proceedings with a speech in Malay addressed particularly to the pupils of the one year course. He urged them to take full advantage of the knowledge gained at the School, to apply that knowledge in after life and, in particular, to take an active interest in rural life, making it their aim to improve the living conditions of their own race.

FERTILIZER PRICES, MAY, 1940.

The following are the prices current for the month of May, 1940, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20.6	—	—	—	114.00
Calcium Cyanamide ...	20.6	—	—	—	120.00
Muriate of Potash ...	—	—	—	60	150.00
Sulphate of Potash ...	—	—	—	48	not available
Superphosphate (concentrated) ...	—	39	—	—	140.00
Superphosphate ...	—	16-18	—	—	75.00
Basic Slag ...	—	16*	—	—	75.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	37.00 ¶
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total ¶ $35.00 per ton *ex* warehouse, Singapore.

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

Departmental.

FROM THE DISTRICTS.

Compiled in the Office of the Chief Field Officer from the Monthly Reports of Agricultural Officers.

April, 1940.

The Weather.

The first part of the month continued to be dry but later frequent showers occurred and although the total rainfall for the month was below the normal, the situation has been relieved and shortage of water supplies is now not so acute. In Johore cool cloudy weather was experienced from early in the month and rain fell there sooner than in other parts of the country.

In Kedah on the coastal plains though the weather was cloudy rain did not fall and conditions are still very dry.

In Kelantan a few showers of rain occurred but actually very little rain fell, quite insufficient to make any appreciable improvement.

Crop Reports.

Rubber.—The price of smoked sheet remained at much the same level.

Supplies of acetic acid are now plentiful. Rationing of this acid by Government has been relaxed, but a measure of control over dealers is still maintained. In order to avoid any recurrence of the coagulant shortage such as occurred soon after the outbreak of war, stocks of acetic acid are being maintained at many agricultural offices.

The use of sulphuric acid has gained ground among small-holders in many parts of the country. It is cheaper than acetic and coagulation can be effected more rapidly. Much of the sheet manufactured with this acid is of inferior quality but as the small-holder does not often receive a very much better price for the good quality sheet, it is not surprising that he is unwilling to buy the dearer acid.

Chinese owners of rubber land in Perak who are undertaking replanting are in many instances interplanting the young rubber with a catch crop. A case is reported where groundnuts were used on flat land. The land was first manured with bat guano at the rate of $2\frac{1}{2}$ piculs per acre and $2\frac{1}{2}$ piculs of slaked lime were also applied. The crop harvested ranged from 21 to 28 piculs of unshelled nuts per acre.

Padi.—Now that the harvest is over in all districts figures for the 1940 crop are becoming available. The crop from Negri Sembilan is lower than had earlier been estimated; although exact figures are not yet available it seems to be certain that the crop will be at least 24 per cent. less than last year. This decrease is due almost entirely to an area of 4,600 acres in Kuala Pilah District which was not

planted owing to unfavourable weather. In Kelantan on the other hand, the crop is rather better than had been expected. Dry padi did well and as there were no floods good crops were harvested from the highly fertile low-lying lands which are a feature of the Kelantan plain.

In Malacca the crop harvested has proved as exceptionally poor as earlier predictions had indicated. The Government will assist distressed padi planters by giving them free seed to plant the next season's crop. To this end the Agricultural Officer, Malacca, is buying a stock of padi. Wherever possible padi will be bought direct from cultivators who have a surplus rather than from dealers. Other relief measures consist in finding work for the people on various Government schemes (mainly in connexion with irrigation and drainage works) so that they may receive some money to tide them over this lean period.

Similar action is being taken in Selangor to assist the cultivators in Panchang Bedena where no crop could be planted because of the continued dry weather.

It is desired to state once more that these losses of crop apply only to certain parts of the country and there is no reason to revise the estimate previously published to the effect that it may safely be assumed that the total crop from Malaya will not be more than 7 per cent. below last year's high record total.

The Government Rice Mills in Krian temporarily ceased buying padi, and the export of padi from the Federated Malay States is again permitted. Up to 24th April 1940, these mills had bought 256,470 piculs of Krian padi of which 205,474 piculs (80 per cent.) were Seraup 48.

Fruit.—The long drought has caused some loss to fruit growers. Many of the trees which have flowered during this period have failed to set properly and the next crop is likely to be light. In Penang and Province Wellesley it is reported that fruit trees have been killed by the drought. It appears that durians have been the most seriously affected but many rambutans and arecanut trees have also died.

Pineapples.—The labour force of one of the Johore factories came out on strike during the month. As was the case during the previous strikes it was the growers who felt the pinch and they are said to have suffered considerable losses on this occasion. The Growers' Association entered into negotiations with the strikers and managed to obtain an early settlement of the dispute.

Poultry.—A survey has recently been made of 228 of the R.I.R. chicks which hatched between December and the end of March and were distributed as day-old chicks to Malay small-holders. It was found that 34 per cent. were still alive; the main causes of death were said to be chills, overfeeding and being taken by hawks. It must be realized that mortality among poultry of all ages as kept in the *kampong* is always high. It seems that the small-holders who have so far tried these chicks think highly of them and are keen to continue.

In order to give Chinese visitors a chance of seeing pure bred R.I.R. chickens, some hens and a cockerel were sent from Sungei Udang Agricultural Station, Malacca, to the Pig Station, which many Chinese squatters are now visiting. The birds

were allowed free range and were fed on a cheap *kampong* ration (which is now under trial at several Agricultural Stations in different parts of the country). The birds did exceedingly well; they improved in condition and laid more eggs than they did when in pens. Visiting Chinese squatters were very interested and many asked for eggs for hatching. Unfortunately disease appeared in the flock and wiped out the whole lot within a few days. A report from the Veterinary Officer who examined the birds has not yet been received, but it is thought that the disease was probably introduced on the feet of visiting squatters from the neighbourhood.

Vegetables at Cameron Highlands.—Different varieties of temperate climate vegetables are always being tried at the Agricultural Station, Tanah Rata. Up to the present little success has been obtained with cauliflowers, but a recent lot of seed which was obtained from Mauritius has given very good results. Most of the plants produced good heads of 1 to 1½ lbs. in weight. This is a good marketable size.

Tomatoes are another crop which does well in the Highlands, producing heavy crops of really high quality fruit. With this crop also certain varieties have proved more suitable for local conditions than others.

LEAVE.

Mr. G. H. Corbett, Senior Entomologist, has been granted 150 days leave from 17th April to 13th September, 1940, inclusive.

Mr. A. E. Coleman-Doscas, State Agricultural Officer, Johore, has been granted 224 days leave from 19th April to 28th November, 1940, inclusive.

The leave granted to Mr. R. B. Jagoe, Botanist, has been extended for a period of two months from 15th June 1940.

Statistical.

MARKET PRICES.

April, 1940.

Major Crops.

Rubber.—The market was relatively steady during April. No. 1. X. Ribbed Smoked Sheet opened at $35\frac{5}{8}$ cents and closed at $35\frac{3}{4}$ cents, the limits of fluctuation being $35\frac{3}{8}$ cents and $36\frac{1}{4}$ cents.

The average of daily quotations for the month was 35.77 cents per lb., as compared with 37.65 cents in March. The London average price was 10.99 pence per lb., and New York 18.97 cents gold, as compared with 11.70 pence and 18.39 cents gold respectively in March.

Prices paid for small-holders' rubber at three centres during the month are given in Table 1.

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, April, 1940.

(Dollars per picul of 133 1/3 lbs.)

Grades	Kuala Pilah, Negri Sembilan				Batu Pahat, Johore.			
	4	11	18	25	3	10	17	24
Smoked sheet ...	42.64	42.65	42.50	42.50	—	41.00	—	—
Unsmoked sheet ...	41.00	40.00	40.50	40.00	40.00	39.80	39.70	39.35
Scrap	—	—	—	—	—	—	—	—

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8 per ton.

Transport from Batu Pahat to Singapore by lorry, excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

No purchases of rubber at Kuala Kangsar on the 3rd, 10th, 17th and 24th April.

Palm Oil.—The following information is taken from *The Oil and Colour Trades Journal,* 29th March, 1940. Controlled maximum prices to large trade consumers and primary wholesalers to operate to 30th March, naked *ex* mill or refinery: palm oil, refined, deodorized £33 per ton, refined (hardened) deodorized £37. Under Acid Oils palm oil is quoted at £15 per ton and £20 (hardened). Palm kernels, West African, uncontrolled, world market quotations £10.15 per ton c.i.f. delivered terms.

Local sales of palm oil, in sellers' drums, were made during April at the following prices: unbleached 8 per cent. f.f.a. $185 per ton f.o.b. Singapore; unbleached 5 per cent. f.f.a. $190 and $200 per ton f.o.b. Port Swettenham

Copra.—The Singapore copra market has been steady since the beginning of the year at $3.80 per picul for the sun-dried grade, but in the middle of April the price weakened to $3.50, recovering, however, to close at $3.80. The average price for the month was $3.68 per picul and the mixed grade was quoted throughout the month at 40 cents per picul lower.

It is understood that a controlled price of £12 per ton for f.m.s. Straits copra is in force in the United Kingdom.

Coconut oil was sold in Singapore during April at an average price of $9.50 per picul f.o.b.

Copra cake fell still further to $1.10 per picul, but recovered to $1.50, averaging $1.30 as compared with $1.80 in March.

Rice.—The Singapore average wholesale prices of rice per picul in April were as follows: Thailand No. 2 Ordinary $4.30, Thailand No. 1 Broken (White) $3.70 No. 2 Broken (White) $3.65. There were no dealings in Rangoon No. 1, Rangoon Parboiled No. 2, and Saigon No. 1 (Long Grain).

The February average retail prices per gantang (gallon) of No. 2 Thailand rice were: Singapore 29, Penang 30½, Malacca, not quoted.

The average declared trade value of imports during February was $4.59 per picul, as compared with $4.23 in January and $3.99 in December.

Padi.—The Government Rice Mills, Perak, are paying a guaranteed price of $2.50 per picul for padi, plus a bonus of 10 cents per picul for pure strain S.K. 48 padi. The Government Rice Mill, Temerloh, Pahang, paid $2.25 per picul during April.

Retail prices of padi per 100 gantangs (gallons) were as follows:—Province Wellesley and Penang $7, Krain, Perak, $7.50 to $9.50, Perak South $9.50 to $10, Selangor $12 to $14, Negri Sembilan $9 to $12, ($15 to $16 Seremban and Port Dickson), Pahang $7 to $13, Malacca $11.40 to $12, Johore $9 to $19, Kelantan $10.70, Labuan $8, Brunei $10 to $16.

Pineapples.—There was again no change in the prices either for the canned product or for fresh fruit, and trading has continued at a standstill pending negotiations regarding the import of canned pineapples into the United Kingdom. It is now reported that the Ministry of Food are taking over purchases and that it is expected that shipments will be resumed shortly.

Beverages.

Tea.—No London prices are available.

The latest Colombo prices available, quoted from *The Ceylon Tea Market Report* of 16th April, 1940, of the Colombo Brokers' Association, are as follows, in rupee cents per lb.:—High Grown 79, Medium Grown 72, Low Grown 70.

Coffee.—Liberian coffee fell from $16.50 per picul to $15, but recovered to $17 averaging $16.30 for the month. Excelsa rose from $15 to $15.50, averaging $15.20. Robusta fell from $9 to $8 and rose to $9.50, averaging $9.

The average of highest and lowest quotations in Singapore for Palembang coffee was $8.94 to $10.94 per picul, and for Sourabaya coffee $12.81 to $14.06. The March average prices were $10.12 to $12 and $13.12 to $14.12 respectively.

Spices.

Arecanuts.—The averages of the Singapore Chamber of Commerce quotations per picul, which were stated to be approximate, were Best $4.75, Medium $4.50, Mixed $4.25.

The averages of the highest and lowest quotations per picul in Singapore were as follows:—Splits $4.25 to $5.69, Red Whole $4.37 to $5.62, Sliced $6.84 to $8.88, as compared with $3.56 to $4.62, $4.62 to $5.62, and $5.81 to $7.56 in March.

Pepper.—Singapore Black rose from $8 to $8.25 per picul, averaging $8.12. Muntok, White rose from $14 to $14.75, closing at $14.50 to average $14.31. The March average prices were $8.15 and $14.05 respectively. The market for Singapore White continued nominal with no quotations.

Nutmegs.—110's improved from $27 to $28 per picul, averaging $27.50, and 80's were quoted throughout the month at $37. The average prices for March were $31.80 and $40.20 respectively.

Penang dried nutmegs were sold at $23 per picul.

Mace.—A nominal market with no quotations. Locally produced mace, dry, was sold in Penang at $75 per picul.

Cloves.—A nominal market with no quotations.

Cardamoms.—Green cardamoms were quoted in *The Ceylon Chamber of Commerce Weekly Report* of 1516 April, 1940, from Rs. 1.45 to Rs. 1.65 per lb.

Miscellaneous.

Derris.—The Singapore market was dull with very restricted demand. Average prices per picul for April were as follows:—$11 to $12 for roots sold on a basis of ether extract, $21 to $23.50 for roots sold on rotenone content. The March averages were $11 to $12, and $22 to $24 respectively.

Gambier.—Cube No. 1 was quoted throughout the month at $14 per picul as compared with an average pirce of $14.60 in March. The market for Block remained nominal with no quotations.

Sago.—Pearl fell from $9 to $8.50 per picul, averaging $8.75, and Flour, Sarawak Fair, rose from $5.75 to $6.10, averaging $6.01. The March average prices were $9.19 and $6.27 respectively.

Tapioca.—Flake Fair fell from $9.50 to $9, averaging $9.25 per picul. Seed Pearl fell from $10.50 to $10, averaging $10.25. Medium Pearl fell from $11 to $10.50, averaging $10.75. The March average prices were $9.90, $10.90 and $11 respectively.

Tobacco.—Prices of prepared tobacco per picul in Kelantan during April were: 1st quality $100 to $160, 2nd quality $70 to $128, 3rd quality $45 to $112. In Johore prepared tobacco sold at $40 to $152, and dried leaf at $15 to $45. In Selangor prepared tobacco sold at 80 cents to $1.40 per kati. In Malacca dried leaf sold at $36 per picul. The range elsewhere was:—Perak South 1st quality $40, 2nd quality $35, 3rd quality $30; Pahang $25 to $38, $15 to $30, $10 to $26; Negri Sembilan $80, $16 to $25, $8 to $18; Province Wellesley and Penang $40, $39.

The above prices are based on London and Singapore daily quotations for rubber, on the Singapore daily prices for copra, on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports and certain coffee prices are kindly supplied by Guthrie & Co. Ltd., Kuala Lumpur, local palm oil prices by Whittall & Co., Kuala Lumpur, the Singapore prices of imported coffee and arecanuts by Lianqui Trading Company of Singapore, and Singapore derris prices by Hooglandt & Co., Singapore.

1 picul = 133 1/3 lbs. The dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Trafalgar Square, London, W.C.2.

MALAYAN AGRICULTURAL EXPORTS, FEBRUARY, 1940.

PRODUCT	Net Exports in Tons				
	Year 1939	Jan./Feb. 1939	Jan./Feb. 1940	February 1939	February 1940
Arecanuts ...	38,489	7,857	8,108	4,147	3,389
Coconuts fresh†‡ ...	97,275†	15,727†	11,245†	8,282†	4,138†
Coconut oil‡ ...	61,360	8,631	9,623	3,783	3,979
Copra‡ ...	34,420	1,095	1,248*	1,735	458
Copra cake ...	10,707	904	2,382	49	1,879
Gambier, all kinds ...	1,572	243	103	176	57
Palm kernels ...	10,774	2,008	1,316	1,010	570
Palm oil ...	59,712	6,619	6,605	3,293	3,659
Pineapples, canned ...	65,802	11,371	9,615	6,884	4,031
Rubber¶ ...	361,484¶	57,548¶	93,646¶	24,974¶	35,966¶
Sago,—flour ...	9,583	1,860	1,184*	778	168
,, —pearl ...	3,883	436	726	249	352
,, —raw ...	4,435*	526*	882*	319*	545*
Tapioca,—flake ...	1,068	111	208	78	72
,, —flour ...	2,706*	358*	248*	215*	91*
,, —pearl ...	18,277	2,282	1,387	1,190	1,161
Derris ...	1,356	204	266	130	123
‡Copra equivalent ...	136,075	15,434	14,614	8,047	7,007

† hundreds in number. * net imports. ¶ production.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates).

Month 1940	Palm Oil			Palm Kernels		
	F.M.S.	U.M.S.	Malaya	F.M.S.	U.M.S.	Malaya
January ...	2,007.6	2,474.0	4,481.6	434.3	497.0	931.3
February ...	1,937.9	1,914.7	3,852.6	411.1	454.0	865.1
March ...	2,081.5	1,895.6	3,977.1	445.3	388.1	833.4
Total ...	6,027.0	6,284.3	12,311.3	1,290.7	1,339.1	2,629.8
Total January to March, 1939 ...	7,049.0	6,744.4	13,793.4	1,240.5	1,178.0	2,418.5
Total for the year 1939 ...	30,157.7	27,215.0	57,372.7	5,639.3	4,533.1	10,172.4

Stocks on estates as at 31st March, 1940, were: palm oil 3,093 tons, palm kernels 1,172 tons.

ACREAGES OF TAPPABLE RUBBER ACTUALLY TAPPED AND NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 31ST MARCH, 1940.

STATE OR TERRITORY	Estimated Acreages of Tappable Rubber (9)+(11)	ACREAGES OF TAPPABLE RUBBER NOT TAPPED				Area of tappable rubber never been tapped (b)		Total area not tapped (3)+(5) (c)		TOTAL AREA TAPPED DURING THE MONTH		Area of tappable rubber rested under rotational systems (c)	
		On estates which have entirely ceased tapping		On estates which have partly ceased tapping (a)									
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)	Acreage	Percentage of (9) to (2)	Average	Percentage of (11) to (2)	Acreage	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S.S.—													
Province Wellesley ...	42,820	907	2.1	11,705	27.4	464	1.1	12,612	29.5	30,208	70.5	8,216	19.2
Malacca ...	116,190	1,906	1.6	19,635	16.9	1,598	1.4	21,541	18.5	94,653	81.5	25,392	21.9
Penang ...	2,601	361	13.9	670	25.7	55	2.1	1,031	39.6	1,570	60.4	60	2.3
Singapore ...	31,556	5,579	17.7	5,975	18.9	241	0.8	11,554	36.6	20,002	63.4	3,066	9.7
Total S.S. ...	193,171	8,753	4.5	37,985	19.7	2,358	1.2	46,738	24.2	146,433	75.8	36,734	19.0
F.M.S.—													
Perak ...	282,334	6,811	2.4	39,108	13.9	6,441	2.3	45,919	16.3	236,415	83.7	41,783	14.8
Selangor ...	313,100	5,302	1.7	34,336	11.0	4,751	1.5	39,638	12.7	273,462	87.3	48,573	15.5
Negri Sembilan ...	258,720	6,503	2.5	43,790	16.9	8,793	3.4	50,293	19.4	208,427	80.6	36,434	14.1
Pahang ...	85,683	1,441	1.7	15.049	17.5	3,807	4.4	16,490	19.2	69,193	80.8	8,468	9.9
Total F.M.S. ...	939,837	20,057	2.1	132,283	14.1	23,792	2.5	152,340	16.2	787,497	83.8	135,258	14.4
U.M.S.—													
Johore ...	476,454	8,404	1.8	86,476	18.1	31,302	6.6	94,880	19.9	381,574	80.1	59,174	12.4
Kedah ...	183,004	5,279	2.9	16,670	9.1	6,027	3.3	21,949	12.0	161,055	88.0	34,786	19.0
Kelantan ...	31,157	403	1.3	4,860	15.6	1,522	4.9	5,263	16.9	25,894	83.1	5,468	17.5
Trengganu (d) ...	4,817	nil	nil	40	0.8	nil	nil	40	0.8	4,777	99.2	1,622	33.7
Perlis (e) ...	1,450	126	8.7	434	29.9	132	9.1	560	38.6	890	61.4	154	10.6
Brunei ...	5,974	nil	nil	1,261	21.1	270	4.5	1,261	21.1	4,713	78.9	1,163	19.5
Total U.M.S. ...	702,856	14,212	2.0	109,741	15.6	39,253	5.6	123,953	17.6	578,903	82.4	102,367	14.6
Total MALAYA ...	1,835,864	43,022	2.3	280,009	15.3	65,403	3.6	323,031	17.6	1,512,833	82.4	274,359	14.9

Notes.—(*a*) Area out-of-tapping on estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.

(*b*) The acreage shown in column (7) is included in columns (3) and (5).

(*c*) Areas of tappable rubber rested under rotational systems are not considered as out-of-tapping and therefore columns (11) and (12) include columns (13) and (14) respectively.

ACREAGE, STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX FOR THE MONTH OF MARCH, 1940, IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January to March 1940		during the month		January to March 1940						
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to March 1940	during the month	Jan. to March 1940	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to March 1940
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	5,526	23,146	12,318	40,816	3,938	22,637	Nil	Nil	Nil	Nil	16,168	2,566	45,662	21,727	...	3,443	22,725	26	70
Johore ...	...	1,970	8,571	5,837	18,769	2,237	14,437	Nil	82	Nil	262	4,082	4,736	11,334	23,245	...	1,083	8,796	...	...
Kedah ...	...	255	5,735	2,759	9,689	494	3,362	Nil	Nil	Nil	Nil	2,275	1,958	5,957	8,887	...	218	4,792	...	...
Perlis ...	...	16	48	13	50	21	93	Nil	Nil	Nil	Nil	Nil	28	Nil	137	...	16	54	...	...
Kelantan ...	...	444	700	353	1,211	471	2,773	Nil	Nil	Nil	Nil	341	533	489	3,404	...	344	750	...	...
Trengganu ...	...	39	245	191	566	242	1,019	Nil	Nil	Nil	Nil	Nil	421	Nil	1,607	...	Nil	296	...	...
Brunei ...	...	14	72	60	200	121	289	...	...	...	...	...	181	...	483	...	Nil	86	...	...
Total Malay States	...	8,264	38,517	21,531	71,301	7,524	44,610	Nil	82	Nil	262	22,866	10,423	63,442	59,490	...	5,104	37,499	26	70
S. SETTLEMENTS :—																				
Malacca ...	...	1,744	2,178	1,162	3,787	585	2,421	Nil		Nil		2,749		8,897		...	1,557	2,111	...	...
Province Wellesley	...	547	1,046	401	1,434	227	756	Nil		Nil		8,547		27,381		...	630	967	...	...
Penang ...	2,200	3,037	15	19	60	134	346	2,357	14,362	9,142	56,593		Nil		Nil	571	2,583	11	...	...
Singapore ...	11,877	16,494	291	156	503	75	212	15,152		54,994		31,107		83,868		5,689	15,031	281	15	48
Labuan ...	...	13	Nil	Nil	Nil	16	46	56		168		Nil		Nil		...	20	Nil	...	...
Total Straits Settlements ...	14,077	21,835	3,530	1,738	5,784	1,037	3,781	17,565	14,362	64,304	56,593	42,403	Nil	120,146	Nil	6,260	19,821	3,370	15	48
Total Malaya ...	14,077	30,099	42,047	23,269	77,085	8,561	48,391	17,565	14,444	64,304	56,855	65,269	10,423	183,588	59,490	6,260	24,925	40,869	41	118

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	2,889	14,001	2,506	1,879	709	144
WET RUBBER	554	1,030	77	328	374	74
TOTAL ...	3,443	15,031	2,583	2,207	1,083	218

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to March 1940
29	30	31
Singapore ...	48,393	130,506
Penang ...	11,510	35,991
Port Swettenham.	5,366	16,547
Malacca ...	Nil	544
MALAYA ...	65,269	183,588

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to March 1940
32	33	34
Malay States ...	33,123	122,534
Straits Settlements	2,976	9,632
MALAYA ...	36,099	132,166

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula : Production + imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 24th April, 1940

METEOROLOGICAL SUMMARY, MALAYA, MARCH, 1940.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of		Mean of A and B	Absolute Extremes				At 1 foot	At 4 feet	Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.		Highest Max.	Lowest Min.	Lowest Max.	Highest Min.					Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Kuala Lumpur Aerodrome Selangor ...	93.7	73.2	83.5	96	69	91	75	85.8	86.3	12.04	305.8	2.44	14	14	9	4	1	239.40	7.72	64
Port Swettenham Aerodrome, Selangor ...	91.0	71.9	81.5	93	68	88	75	87.9	86.6	6.75	171.5	1.75	14	10	2	—	1	253.90	8.19	68
Sitiawan, Perak ...	90.2	73.8	82.0	92	71	86	76	84.5	84.9	4.07	103.4	1.89	12	10	3	—	—	234.35	7.56	63
Ipoh Aerodrome, Perak ...	93.3	73.0	83.1	96	71	86	77	85.8	85.2	2.26	57.4	0.70	11	9	5	—	—	239.70	7.73	64
Temerloh, Pahang ...	93.6	71.7	82.7	96	68	90	74	86.2	86.5	3.42	86.9	1.91	7	7	3	3	—	237.30	7.65	63
Kuala Lipis, Pahang ...	93.0	72.4	82.7	96	70	90	75	86.1	85.0	1.52	38.6	0.60	5	5	—	11	—	245.20	7.91	65
Kuala Pahang, Pahang ...	86.8	75.7	81.3	89	73	84	81	89.3	87.4	1.30	33.0	1.15	3	3	—	—	—	265.55	8.57	71
Kallang Aerodrome, S'pore ...	89.0	75.4	82.2	92	73	85	78	84.0	84.2	2.59	65.8	0.74	6	5	2	—	1	240.75	7.77	63
Bayan Lepas Aerodrome Penang ...	90.5	74.9	82.7	93	70	85	78	87.3	86.8	2.28	57.9	0.84	9	8	4	—	—	257.10	8.29	69
Malacca Town, Malacca ...	89.4	74.6	82.0	94	72	84	77	87.6	86.8	1.68	42.7	0.70	4	4	2	—	1	270.70	8.73	72
Kluang, Johore ...	92.3	71.1	81.7	96	68	89	73	83.0	82.7	9.65	245.1	3.12	8	7	5	3	2	246.95	7.97	66
Mersing, Johore ...	87.1	72.7	79.9	90	69	84	78	84.3	82.6	1.53	38.9	1.06	4	4	—	—	—	283.90	9.16	76
Alor Star, Kedah ...	96.5	71.8	84.1	99	69	91	75	89.2	88.3	0.92	23.4	0.51	5	3	1	—	1	275.05	8.87	73
Kota Bahru, Kelantan ...	90.1	70.5	80.3	92	67	86	75	83.4	83.2	Trace	—	—	—	—	—	2	—	299.65	9.67	81
Kuala Trengganu, Trengganu	†																			
Labuan ...	86.5	76.9	81.7	90	74	82	79	87.7	87.1	3.69	93.7	1.34	12	7	—	—	—	249.05	8.03	66
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	75.1	63.1	69.1	79	60	71	65	73.0	72.2	0.69	17.5	0.22	8	5	1	22	—	204.80	6.61	55
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	74.2	51.5	62.9	77	44	72	60	69.2	69.1	4.51	114.6	1.05	14	10	1	3	—	175.15	5.65	47
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	74.8	60.0	67.4	80	57	70	62	*	*	4.37	111.0	1.17	12	10	—	—	—	199.30	6.43	53

* Not recorded